

What Is Claimed Is:

1 1. An IPS-LCD with a compensation electrode structure,
2 comprising:

3 a first glass substrate and a second glass substrate
4 arranging in parallel to each other;

5 a liquid crystal layer formed in a space between first glass
6 substrate and the second glass substrate;

7 a plurality of gate lines extending in a first direction
8 and formed on the first glass substrate;

9 a plurality of data lines extending in a second direction
10 and formed on the first glass substrate, wherein the second
11 direction is perpendicular to the first direction, and the data
12 lines and gate lines constitute a plurality of pixel areas
13 arranging in a matrix form;

14 a plurality of TFT formed in the plurality of pixel areas
15 respectively;

16 a plurality of comb-shaped common electrode structures
17 disposed in the plurality of pixel areas respectively on the
18 first glass substrate, wherein each comb-shaped common
19 electrode structure comprises a common line parallel to the gate
20 line and at least two common electrodes extending in the second
21 direction;

22 a plurality of comb-shaped pixel electrode structures
23 disposed in the plurality of pixel areas respectively on the
24 first glass substrate, wherein each comb-shaped pixel electrode
25 structure comprises a bar near the gate line and at least one
26 pixel electrode which extends in the second direction and is
27 inter-digitated with the two common electrodes; and

28 a plurality of compensation electrode structures disposed
29 in the plurality of pixel areas respectively on the first glass
30 substrate, wherein each compensation electrode structure
31 comprises at least a first compensation electrode and a second
32 compensation electrode which extend in the second direction and
33 are patterned on the same plane with the pixel electrode;

34 wherein, the first and second compensation electrodes
35 overlap the two common electrodes respectively, and a first
36 interval between the first compensation electrode and the pixel
37 electrode is equal to a second interval between the pixel
38 electrode and the second compensation electrode.

1 2. The IPS-LCD with a compensation electrode structure as
2 claimed in claim 1, further comprising at least two through holes
3 over the common line, in which the first and second compensation
4 electrodes are electrically connected to the common line via the
5 two through holes, respectively.

1 3. The IPS-LCD with a compensation electrode structure as
2 claimed in claim 1, further comprising an insulating layer
3 disposed between the compensation electrode and the common
4 electrode.

1 4. The IPS-LCD with a compensation electrode structure as
2 claimed in claim 1, wherein the pixel electrode and the
3 compensation electrodes are made of a transparent conductive
4 material.

1 5. The IPS-LCD with a compensation electrode structure as
2 claimed in claim 1, wherein the pixel electrode and the
3 compensation electrodes are ITO or IZO.

1 6. The IPS-LCD with a compensation electrode structure as
2 claimed in claim 1, wherein the common electrodes are made of
3 a non-transparent conductive material.

1 7. The IPS-LCD with a compensation electrode structure as
2 claimed in claim 1, wherein the common electrodes are made of
3 Al or MoW.

1 8. The IPS-LCD with a compensation electrode structure as
2 claimed in claim 1, wherein each common electrode is made of the
3 same material and patterned on the same plane with the common
4 line.

1 9. The IPS-LCD with a compensation electrode structure as
2 claimed in claim 1, wherein each common electrode is made of the
3 same material and patterned on the same plane with the gate line.

1 10. The IPS-LCD with a compensation electrode structure
2 as claimed in claim 1, wherein each common electrode is made of
3 the same material and patterned on the same plane with the data
4 line.

1 11. The IPS-LCD with a compensation electrode structure
2 as claimed in claim 1, wherein each common electrode is
3 electrically connected to the common line.

1 12. The IPS-LCD with a compensation electrode structure
2 as claimed in claim 1, wherein each common electrode is not
3 electrically connected to the common line.

1 13. The IPS-LCD with a compensation electrode structure
2 as claimed in claim 1, wherein the width W1 of each common
3 electrode and the width of each compensation electrode W3
4 satisfy the formula: $W3 - W1 \geq 1\mu\text{m}$.

1 14. A method of forming an IPS-LCD with a compensation
2 electrode structure, comprising steps of:

3 providing a glass substrate;

4 forming a plurality of gate lines extending in a first
5 direction on the glass substrate;

6 forming a comb-shaped common electrode structure within
7 each predetermined pixel area, wherein the comb-shaped common
8 electrode structure comprises a common line parallel to the gate
9 line and at least two common electrodes extending in a second
10 direction that is perpendicular to the first direction;

11 forming an insulating layer to cover the gate lines, the
12 comb-shaped common electrode structure and glass substrate;

13 forming a plurality of data lines extending in the second
14 direction on the insulating layer, wherein the data lines and
15 the gate lines constitute a plurality of pixel areas arranging
16 in a matrix form;

17 forming a comb-shaped pixel electrode structure disposed
18 in each pixel area on the insulating layer, wherein the
19 comb-shaped pixel electrode structure comprises a bar near the
20 gate line and at least one pixel electrode which extends in the

21 second direction and is inter-digitated with the two common
22 electrodes; and

23 forming a compensation electrode structure disposed in
24 each pixel area, wherein the compensation electrode structure
25 comprises at least a first compensation electrode and a second
26 compensation electrode which extend in the second direction and
27 are patterned on the same plane with the pixel electrode;

28 wherein, the first and second compensation electrodes
29 overlap the two common electrodes respectively, and a first
30 interval between the first compensation electrode and pixel
31 electrode is equal to a second interval between the pixel
32 electrode and the second compensation electrode.

1 15. The method of forming an IPS-LCD with a compensation
2 electrode structure as claimed in claim 14, further comprising
3 a step of forming a TFT within each pixel area.

1 16. The method of forming an IPS-LCD with a compensation
2 electrode structure as claimed in claim 14, further comprising
3 steps of:

4 forming at least two through holes over the common line;
5 and

6 electrically connecting the first and second compensation
7 electrodes and the common line via the two through holes,
8 respectively.

1 17. The method of forming an IPS-LCD with a compensation
2 electrode structure as claimed in claim 14, wherein the pixel
3 electrode and the compensation electrodes are made of a
4 transparent conductive material.

1 18. The method of forming an IPS-LCD with a compensation
2 electrode structure as claimed in claim 14, wherein the common
3 electrodes are made of a non-transparent conductive material.

1 19. The method of forming an IPS-LCD with a compensation
2 electrode structure as claimed in claim 14, wherein each common
3 electrode is made of the same material and patterned on the same
4 plane with the common line, the gate line or the data line.

1 20. The method of forming an IPS-LCD with a compensation
2 electrode structure as claimed in claim 14, wherein each common
3 electrode is electrically connected to the common line.

1 21. The method of forming an IPS-LCD with a compensation
2 electrode structure as claimed in claim 14, wherein each common
3 electrode is not electrically connected to the common line.

1 22. The method of forming an IPS-LCD with a compensation
2 electrode structure as claimed in claim 14, wherein the width
3 W1 of each common electrode and the width of each compensation
4 electrode W3 satisfy the formula: $W3 - W1 \geq 1\mu\text{m}$.